Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 97 of the	)	
Commission's Rules Governing	)	RM-8737
the Amateur Radio Service to	)	
Facilitate Spread Spread Spectrum	)	
Communication		

To: The Commission

REPLY COMMENTS of PAUL H. TROTTER AA4ZZ

Introduction

I have been a licensed amateur since 1975. I currently hold an Amateur Extra class license. During my twenty years as a radio amateur I have primarily operated weak signal modes on the 50, 144, 222, 432, and 1296 megahertz bands. I have made contacts using many propagation modes including Sporadic-E, Tropospheric Ducting, Meteor Scatter, Aurora, and Earth-Moon-Earth (also known as EME or moonbounce). I also hold a Bachelor of Science in Engineering degree in electrical engineering from Duke University. I was employed for several years designing microwave communications links in the 2 and 6 gigahertz range for a major public utility company.

In this role I had extensive experience in the area of the effects of noise level and path loss on radio communications.

Summary

I am concerned that the Petition for Rule Making 8737 filed by the American Radio Relay League (ARRL) on December 12, 1995 will have very negative impact on weak signal UHF and microwave terrestrial communication. Amateur weak signal terrestrial VHF, UHF, and microwave communication has greatly advanced the science of radio propagation by discovering new propagation modes and providing data to further the understanding of these propagation modes. The interference from wide spread use of spread spectrum techniques will severely impact the ability of radio amateurs to provided further insight into radio propagation in the VHF and microwave regions. However, I do strongly support the removing of many of the technical and administrative obstacles to the use of spread spectrum techniques in the Amateur Radio service. I, therefore, recommend that the relaxation of the spread spectrum rules proposed in RM-3787 be accompanied by specific limitations on the frequency bands in which spread spectrum communications will be allowed.

Discussion

Radio amateur weak signal VHF, UHF, and microwave operators have discovered a number of previously unknown propagation modes including Sporadic-E ionization, field aligned irregularities, Tropospheric ducting, meteor scatter, aurora, and transequitorial propagation. On numerous occasions scientists have published requests in amateur journals for information from amateur radio weak signal operators about their radio contacts to help them understand these and other modes of VHF, UHF, and microwave radio propagation. In their efforts to extend communications range by getting every possible tenth of a decibel of gain from a given size antenna, weak signal operators have developed antenna designs which are a significant improvement of the state of the art. These antenna designs are now widely used in both the commercial and amateur communities.

Contrary to the sweeping pronouncements and NBFM examples cited by spread spectrum proponents, the signal levels weak signal operators deal with are often just above the noise level. This is particularly true of the unusually long distance contacts that are of the most interest for radio propagation studies. That use of spread spectrum will raise the noise floor is admitted by spread spectrum proponents. What they fail to understand is the seriousness of this interference to weak signal operators, and the difficulty of weak signal operators in finding the source of this interference.

That spread spectrum communications have and will produce signal levels strong enough to key NBFM repeaters is admitted by Mr. Robert Buaas in his comments and implied by the ARRL in their original proposal. As an amateur with extensive weak signal experience, it has been my experience that many of the SSB and CW signals common to weak signal operation are much too low in signal level to key an NBFM repeater. The low noise preamps, high gain directional antennas, and narrow bandwidth SSB and CW receivers used by weak signal operators make regular communications possible with signals of a level to be completely covered up by a signal that barely unsquelches a typical NBFM repeater.

Further, for a weak signal operator to track down the source of spread spectrum interference could be extremely difficult. Spread spectrum proponents have commented on the uselessness of a CW identification given the variability of the frequency on which it might be found. Further, the very nature of weak signal work, covering very long distances during unusual propagation conditions which last for seconds, minutes, or at most hours, makes the time tracking the source of the interference and the ability to cure it during the short time that the propagation exists, unworkable. For example, a typical period of Tropospheric ducting might last just one to four hours and provide communication for a station in North Carolina south down the coast to the Florida Keys and therefore, the weak signal operator with spread spectrum interference would know the interference was coming from somewhere in an area approximately 800 miles long by 100 miles wide, or 80,000 square miles. For the weak signal operator to find the source of the

interference in this large area, contact the control operator of the spread spectrum station, and negotiate with the spread spectrum station control operator to get him to shut down all prior to the end of the Tropospheric ducting would likely be impossible. Furthermore, times of unusual propagation are also often accompanied by increases in the natural noise level. Therefore, to identify that the interference was of a man made and not natural source might be difficult. Given the much larger areas and further distances that can be covered by band openings on 50 MHz and 144 MHz the proposal by Mr. Robert Buaas and TAPR that spread spectrum be allowed on these bands in addition to those proposed by the ARRL is especially troubling. On 50 MHz with multihop E skip, transequatorial, or F2 propagation there is the very real possibility of US spread spectrum communication causing interference to weak signal operations by radio amateurs on other continents. Given these factors, frequency sharing between weak signal operation and spread spectrum communications is very inadvisable and would cause serious inpacts on community of weak signal operators.

Proposal

I propose that the commission encourage the use of spread spectrum, while protecting weak signal and other existing users from interference. This can be accomplished by approving the regulator reduction aspects of RM8737, while at the same time limiting the use of spread spectrum to frequencies where its potential for interference would be minimized.

In particular, I propose that spread spectrum be authorized only in the following segments of the Amateur Service bands:

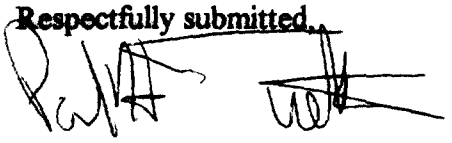
905 - 928 MHz
1240 - 1260 MHz
2410 - 2450 MHz
3300 - 3445 MHz

All above 5500 except 5750 - 5770 MHz and 10.360 - 10.380 GHz. Note that no portion of the 420-450 MHz band has been included in the above list. This is due to the high level of existing activity in this band and the potential for severe interference to existing users of this band. These proposed frequencies provide protection for existing weak signal operations near 432, 902, 1296, 2304, 3456, 5760, and 10, 368 MHz. At the same time, they provide spread spectrum operators access to over 200 MHz of spectrum in the Amateur bands below 5 GHz, and vastly more spectrum in the higher frequency microwave bands.

Conclusion

I recommend that the Commission incorporate the above frequency allocation plan when formulating new spread spectrum rules designed to foster its widespread use among amateur radio operators. I see no need to place any other restrictions on spread spectrum use, except for regulations, such as spurious emission limits, which already apply to the Amateur Radio service as a whole. I believe that such a course will foster growth of spread spectrum among amateurs and allow them to continue in their historic pursuit of new technologies and the use of higher and higher frequencies, while not disrupting the advances in the knowledge of propagation and antenna design being contributed by the weak signal operators.

Respectfully submitted,



Paul H. Trotter
1515 Mockingbird Lane, Suite 900
Charlotte, NC 28209

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